Central Nervous Conditions and Summary

CNS Overview

- **All animals with CNS signs will be condemned ante-mortem**
- **Prevents possibility of introducing spongiform agent into our beef supply**
- **Local, peripheral, and physiological conditions can mimic CNS disorders**

CNS Disorders

- **Grass tetany in cattle and sheep**
  - **Low magnesium levels, cows/ewes in heavy lactation on lush pastures**
  - **Irritable, walk stiffly, falling, convulsions**

- **Transport tetany in ruminants**
  - **Usually pregnant cows/ewes**
  - **Low calcium or magnesium**
  - **Incoordination, paralysis, death**

CNS

- **Lactation tetany in mares**
  - **Stress…calcium or magnesium low**
  - **seen soon after foaling or two days after weaning**
  - **stiff legs, high tail carriage, tremors, rapid respiration**

- **Milk fever in cows/ewes**
  - **Low calcium levels when give birth/lactate**
  - **Unsteady gait, collapse, die**

CNS

- **Ketosis in cows - metabolic disorder**
  - **Low blood sugar within a few weeks of calving**
  - **lethargy, weight loss, acetone odor to breath**
  - **may become frenzied or aggressive…head pressing, circling, staggering, hyperactive**

- **Pregnancy toxemia in cows (or ewes)**
  - **beef cows fed heavily in first two trimesters of pregnancy then stressed in last trimester**
  - **Restless, incoordinated**

CNS

- **Porcine stress syndrome (malignant hyperthermia)**
  - **Inherited metabolic disorder of muscle calcium kinetics brought on by transport**
  - **Muscle tremors, rigor, death**
  - **May cause pale, soft, exudative meat (PSE)**

- **Polioencephalomalacia**
  - **Thiamine deficiency causes brain damage**
  - **depression, blindness, reverse curve to spine, convulsions**

CNS

- **Rabies - viral infection**
  - **Cattle may attack man, be alert and bellow a lot**
  - **Horses may roll as if colicy, bite and strike**
  - **Animals bitten by a rabid animal may not be slaughtered for food purposes for at least 8 months**
  - **Suspects must be isolated**

CNS

- **Pseudorabies (mad itch) - viral CNS mostly seen in pigs**
  - **General illness, severe itch, trembling, incoordination, convulsions, coma, death**

- **Bovine Spongiform Encephalopathy (mad cow disease)**
  - **Prion causes slow destruction of brain tissue**
  - **Abnormal behavior, incoordination, loss of body condition**

CNS

- **Scrapie - progressive neurological disorder of sheep**
  - **Prion caused? A TSE…**
  - **Intense itch, tremors, incoordination, emaciation, death**

Toxins that cause CNS Disorders

- Organic arsenicals in pigs (growth promoters)
- Lead from forage or environment
- Moldy corn (fumonisin B1) in horses
- Organochlorine (chlorinated hydrocarbons) from environment

Toxins

- **Organophosphates (nerve agents)**
- **Paspalum staggers (*Claviceps* fungus on grasses)**
- **Nitrates and nitrites in plants, fertilizers**
- **Ammonia toxicosis from eating excess urea**
- **Petroleum hydrocarbon toxicity (gas, diesel, etc)**

Toxins

- Ryegrass staggers - mycotoxin
- Salt poisoning/water deprivation
- Selenium poisoning from forages and grain in some western US and Mexican soils
- Senecio poisoning - toxic plants affect liver
- Sorghum (Sudan grass) - horses

Special CNS Cases

- **Wobbler Horses**
  - **young horses with spinal malformation**
  - **Can pass if diagnosed with x-rays and workup by Vet**
- **Downer Cows - generally condemn or suspect**
  - **May hold to assess**
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Summary

- Ante-mortem/post-mortem inspection must be done for each animal
- Many diseases look alike and can only be differentiated by experienced personnel/vet or pathologist
- Animals can be condemned, trimmed, or passed
- Ante-mortem inspection may result in suspect classification

General guidelines for disposition

- **Condemn when systemic/generalized changes present**
  - **Septicemia/toxemia/pyemia**
  - **Cachexia, polyarthritis, pneumonia, lymph node involvement**
  - **Generalized fluid accumulation, pigments, parasitic cysts**
  - **Neoplasia metastasis or <u>any</u> LYMPHOMA**
  - **Any CNS disorder**

Organs of interest

- Liver, lungs, spleen, kidneys, heart, digestive tract, diaphragm, muscle tissue, skin, eyes, lymph nodes, major nerve tissue (spinal cord, brachial plexus), rib cage, bladder, tongue
- Head of cattle (4 pair of LNs) or hogs, cheek muscle

Newer USDA requirements

- Must palpate (not just visualize) the spleen, esophagus, and outer heart surface for cattle
- Look/feel for pea-sized cysticerci

True Health Threats

- ***Staph aureus* toxins (mastitis)**
- **Tuberculosis, anthrax, brucellosis**
- **Coccidioidomycosis (unlikely)**
- ***Cysticercus bovis, C. cellulosae***
- **Trichinosis**
- **Toxins (lead, OP, etc)**
- **BSE, scrapie?**
- **Rabies (ante-mortem)**
- **Enteric pathogens**

Carcass Handling/Sanitation

- Electrical stimulation
  - Improves meat quality
  - High voltage series of shocks after evisceration
  - Low voltages used after stunning

Sanitation

- Any gross contamination of carcass by urine, feces, stomach contents or milk is unacceptable
- Tie off intestinal tract before electrical stimulation or evisceration
- Overall cleanliness and sanitation of facility is Important - floors, walls , and ceilings do matter

Kill Floor Construction

- Floor must drain and be compartmentalized to separate carcass from viscera
- Floor sealed to walls
- Equipment must be sealed to floor or easily moved for cleaning
- Welds should be ground smooth and of parent metal

Kill Floor Construction

- Walls and floors should be smooth, impervious, and easy to clean
- Water for cleaning should be 180ºF
- Tissue contact surfaces should be stainless steel

Equipment Sanitizing

- Live steam
- 180ºF Chlorine rinse (25 ppm)
- G-Whiz foam (enzymatically dissolves protein…must be followed by chlorine wash
- Any common equipment that touches edible tissue must be sterilized between carcasses (180ºF for 1 - 1.5 sec))

Antimicrobial treatment

- Chlorinated water (20-50 ppm)
- Hot water (165F for at least 10 sec)
- Organic acid washing (2% lactic or acetic)
- Steam pasteurization (195F for 15 sec)
- Irradiation
- Tri-sodium phosphate
- Air blow-off
- Pre-evisceration water rinse OK

Chilling

- Pork carcass
  - -30C blast chill, 0-1C pre-chill cooler, 2-4C holding cooler
- Cattle and lamb
  - Air chill or water sprinkler cooloing in pre-chill cooler (0-1C)
  - 50F (10C) surface temp within 5 hrs
  - 40F or less within 24 hrs

Meat Quality

- Institutional Meat Purchase Specifications (IMPS) from USDA
  - Describes cuts of meat
- Off conditions (unacceptable)
  - Stickiness - temperature abuse
  - Slime - microbes
  - Sourness - off odor
  - Rancidity - fat deteriorization

Unacceptable Off Conditions

- Discoloration
  - Dark cutter - dark red to black
  - Spotter - blood spots on ribeye
  - Fired beef - red streaks on outside surface of carcass
  - Sores or scars - grubs
  - blistering - bleached slimy area

Wild Cards

- Local disease outbreaks - approved region?
- Antibiotic residues
- Local inspectors expertise and regulatory framework
- Growth stimulants (hormones)

Residues

- Drugs, pesticides, contaminants
- Need to foster prudent use of drugs and pesticides
- USDA current in-plant rapid screening
  - SOS - swine urine for sulfonamides
  - CAST - kidney/liver of bob veal calves
  - STOP - antibiotics in kidney tissue
  - FAST - swab test on kidney or liver tissue of cattle and bob veal

Aging and Conditioning

- Old system: 7-14+ days aging for beef
- New system:
  - Fabricate within 1-2 days after slaughter
  - Vacuum package into boxed beef
  - Distribute to retail
  - Aged 7-28 days in the process

The End